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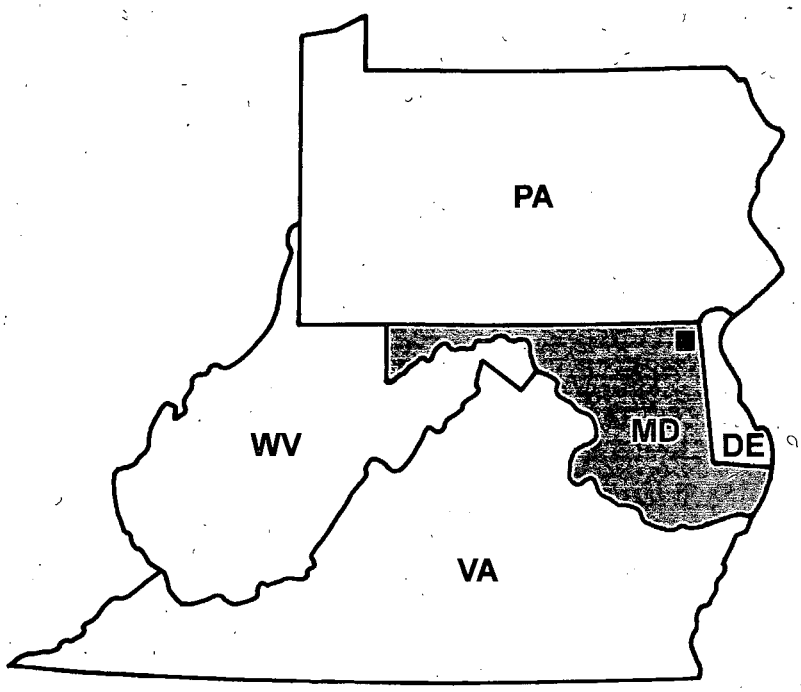
AERIAL PHOTOGRAPHIC ANALYSIS OF FORMER TRIUMPH EXPLOSIVES PLANT

Elkton, Maryland

Volume 1

EPA Region 3



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AERIAL PHOTOGRAPHIC ANALYSIS OF FORMER TRIUMPH EXPLOSIVES PLANT

Elkton, Maryland

Volume 1

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NOTICE

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ABSTRACT

This report presents the findings from a historical aerial photographic analysis of the Former Triumph Explosives Plant located in Elkton, Cecil County, Maryland. Nineteen years of historical photographs covering the period from 1938 through 1999 were analyzed, nine of which were reproduced for inclusion in this report. The purpose of this analysis is to document landscape morphology, patterns of hazardous waste disposal, and other observable conditions of environmental significance on this 470-hectare (1163-acre) study area. This report provides operational remote sensing support to U.S. Environmental Protection Agency (EPA) Region 3 for a site assessment under the Comprehensive, Environmental Response, Compensation, and Liability Act (CERCLA). This report is presented in two volumes, one which presents the text descriptions and analyses, the second the aerial photographs and interpretive overlays.

An earlier aerial photographic analysis report entitled, "Site Analysis, Thiokol Corporation, Elkton, Maryland" (EPA, 1986) covered the westernmost portion of this current report for years 1952 to 1985. However, this current analysis was conducted independently of the results documented in the 1986 report. Only the photographs acquired in 1952 are common to these two reports.

The photographic analysis presented in this 2003 report revealed the presence of numerous waste disposal areas, small piles of solid waste and debris, drums, and numerous vertical and horizontal storage tanks. A burn area, a building ruined by a probable fire, numerous small structures and buildings partially enclosed by earthen berms, and earthen berms without structures were also identified throughout the analysis period.

The EPA Environmental Sciences Division, Landscape Ecology Branch in Las Vegas, Nevada, prepared this report for the EPA Region 3 Hazardous Waste Management Division in Philadelphia, Pennsylvania, and the EPA Office of Emergency and Remedial Response in Washington, D.C.

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INTRODUCTION

This report presents the findings from a historical aerial photographic analysis of the Former Triumph Explosives Plant located in Elkton, Cecil County, Maryland (Figures 1 and 2). Black-and-white, color, and color infrared historical aerial photographs were obtained to cover the period from 1938 through 1999. Nineteen years of photographs were analyzed, of which nine years (1938, 1942, 1947, 1952, 1957, 1969, 1979, 1990, and 1999) were reproduced and are included in Volume 2 of this report. The purpose of this analysis is to document landscape morphology, patterns of hazardous waste disposal, and other observable conditions of environmental significance at the former explosives plant. This analysis and report provides operational remote sensing support for site assessment conducted by the Region 3 office of the U.S. Environmental Protection Agency (EPA) under the Comprehensive, Environmental Response, Compensation, and Liability Act (CERCLA).

The Former Triumph Explosives Plant covers 470 hectares (1163 acres). Roads which comprise the boundaries of the plant include Nottingham Road, West Pulaski Highway (U.S. Route 40), Blue Ball Road (State Route 545), North Bridge Street (State Route 213), State Route 279, and Zeitler Road. Additional boundaries include Little Elk Creek, Dogwood Run, and a railroad line. Boundaries used in this analysis were determined from observations made on aerial photographs and collateral information, and do not necessarily denote legal property lines or ownership. The area surrounding the plant is generally used for residential and agricultural purposes, although commercial and light-industrial complexes are also present.

An earlier aerial photographic analysis report was prepared entitled, "Site Analysis Thiokol Corporation, Elkton, Maryland" (EPA, 1986). That report included analyses of 58 hectares (145 acres) in the western portion of the plant adjacent to Little Elk Creek. The 1986 report included analyses for 1952, 1964, 1970, 1975, and 1985. The

current report does not reexamine the 1986 report and only the 1952 photograph is in common with the earlier report. Significant findings discovered in the 1986 report included the presence of drums, tanks, impoundments, fill areas, possible waste piles, piles of probable debris, pits, standing liquid, a possible incinerator stack, a burn area, bunkers, and mounded material.

This current report is presented in two volumes. Volume 1 contains the text of the report, including the introductory, methodological, and photographic analysis discussion sections. Volume 2 contains the various maps and the photographs, with respective annotated overlays.

According to collateral information (EPA, 2002), the Former Triumph Explosives Plant has had multiple occupants and owners. Portions of the plant were formerly operated by the Department of Defense (DOD) and owned by various entities of private industry. Explosives, munitions, pyrotechnics, and agricultural chemicals were produced, and solvents, degreasers, and cleaners were reported to be used at several locations within the plant by various manufacturing and other industrial operations. Environmental studies performed in the 1980s and early 1990s indicated the presence of numerous organic and inorganic contaminants in the surface water, groundwater, and soil.

The text of the aerial photographic analysis is organized around the groups or complexes of buildings or a grouping of berms (with or without structures). The berms are either square or circular in shape (no distinction between these made in the analysis), many of which include an opening for vehicles to pass through. The complexes include buildings, sheds, a road network, and walkways. Thus, these features are described collectively in the text as a "building complex."

In 1938 the study area was mostly used for agricultural purposes, although two building complexes were noted. By 1942, significant development had occurred, including the construction of numerous building complexes, a sizeable railroad system, and a road network. Small structures partially surrounded by berms, as well as berms without structures, were first noted this year and were then observed throughout the analysis period. Many of these structures and berms remained in the

same location for many years, some could not be distinguished in subsequent years either because of vegetation cover or their removal, and newly constructed berms were continuously identified at various locations throughout the analysis period. In 1947 a new building complex and the expansion of the existing complexes were observed. In 1952 one waste disposal area, one probable waste disposal area, and three possible waste disposal areas were observed. In addition, both vertical and horizontal storage tanks were noted at this time and were observed throughout the remainder of the analysis period. In 1957, a new waste disposal area and a new possible waste disposal area were identified. In 1969 three additional waste disposal areas and a burn area were evident. Drums, small piles of solid waste, trenches, and the ruins of a building caused by probable fire damage were also apparent. In 1979 waste disposal areas and probable waste disposal areas remained active. By 1990 large scale deposition activity could not be identified; however, possible solid waste and possible drums were noted at several locations. In 1999 small piles of possible solid waste continued to be observed.

An additional overlay is provided for the 1999 analysis year. The overlay includes the approximate locations of waste disposal areas, and berms with or without structures from 1942 through 1990.

In Volume 1 of this report, a Glossary, defining features or conditions identified in this report, follows the Photographic Analysis section. Sources for all maps, aerial photographs, and collateral data used in the production of this report are listed in the References section. A list of all aerial photographs that were identified and evaluated for potential application to this study can be obtained by contacting the EPA Work Assignment Manager. Historical aerial photographs used in the analysis of this site have been digitally scanned and printed for use in this report. A transparent overlay with interpretative data is affixed to each of the digital prints. See the Methodology section for a discussion of the scanning and printing procedures.

The EPA Environmental Sciences Division, Landscape Ecology Branch in Las Vegas, Nevada, prepared this report for the EPA Region 3 Hazardous Waste Management Division in Philadelphia, Pennsylvania, and the EPA Office of Emergency and Remedial Response in Washington, D.C.

METHODOLOGY

This report was prepared using a standard methodology that includes the following steps:

- data identification and acquisition,
- photographic analysis and interpretation, and
- graphics and text preparation.

These steps are described below. Subsections also address details related to specific kinds of analyses that may be required to identify environmental features such as surface drainage and wetlands. All operational steps and processes used to perform this work (including data identification and acquisition, photographic analysis and interpretation, and graphics and text preparation) adhere to strict QA/QC guidelines and standard operating procedures (SOPs). These guidelines and procedures are documented in the Master Quality Assurance Project Plan (QAPP) prepared for Remote Sensing Support Services Contract No. 68-D-00-267 (LMS, 2002).

Data identification and acquisition included a search of government and commercial sources of historical aerial film for the study area. Photographs with optimal spatial and temporal resolution and image quality were identified for acquisition. In addition, U.S. Geological Survey (USGS) topographic maps were obtained to show the study area location and to provide geographic and topographic context.

To conduct this analysis, the analyst examined diapositives (transparencies) of historical aerial photographs showing the study area. Diapositives are most often used for analysis instead of prints because the diapositives have superior photographic resolution. They show minute details of significant environmental features that may not be discernible on a paper print.

A photographic analyst uses a stereoscope to view adjacent, overlapping pairs of diapositives on a backlit light table. In most cases, the stereoscope is capable of various magnifications up to 60 power. Stereoscopic viewing involves using the principle of parallax (observing a feature from slightly different positions) to observe a three-dimensional representation of the area of interest. The stereoscope enhances the photo interpretation process by allowing the analyst to observe vertical as well as horizontal spatial relationships of natural and cultural features.

The process of photographic analysis involves the visual examination and comparison of many components of the photographic image. These components include shadow, tone, color, texture, shape, size, pattern, and landscape context of individual elements of a photograph. The photo analyst identifies objects, features, and "signatures" associated with specific environmental conditions or events. The term "signature" refers to a combination of components or characteristics that indicate a specific object, condition, or pattern of environmental significance. The academic and professional training, photo interpretation experience gained through repetitive observations of similar features or activities, and deductive logic of the analyst as well as background information from collateral sources (e.g., site maps, geologic reports, soil surveys) are critical factors employed in the photographic analysis.

The analyst records the results of the analysis by using a standard set of annotations and terminology to identify objects and features observed on the diapositives. Significant findings are annotated on overlays attached to the photographic or computer-reproduced prints in the report and discussed in the accompanying text. Annotations that are self-explanatory may not be discussed in the text. The annotations are defined in the legend that accompanies each print and in the text when first used.

Objects and features are identified in the graphics and text according to the analyst's degree of confidence in the evidence. A distinction is made between certain, probable, and possible identifications. When the analyst believes the identification is unmistakable (certain), no qualifier is used. Probable is used when a

limited number of discernible characteristics allow the analyst to be reasonably sure of a particular identification. Possible is used when only a few characteristics are discernible, and the analyst can only infer an identification.

The prints in this report have been reproduced, either by photographic or computer methods, from the original film. Reproductions are made from the original film and may be either contact (the same size) prints or enlargements, depending on the scale of the original film. Any computer-produced prints used in this report are generated from scans of the film at approximately 1,300 dots per inch (dpi) and printed at 720 dpi. Although the reproductions allow effective display of the interpretive annotations, they may have less photographic resolution than the original film. Therefore, some of the objects and features identified in the original image and described in the text may not be as clearly discernible on the prints in this report.

Study area boundaries shown in this report were determined from aerial photographs or collateral data and do not necessarily denote legal property lines or ownership.

Surface Drainage

The surface drainage analysis produced for this report identifies the direction and potential path that a liquid spill or surface runoff would follow based on the topography of the terrain and the presence of discernible obstacles to surface flow. The analyst determines the direction of surface drainage by stereoscopic analysis of the aerial photographs and by examining USGS topographic maps. Site-specific surface drainage patterns are annotated on the map or photo overlay. Where the direction of subtle drainage cannot be determined, an indeterminate drainage line symbol is used. Regional surface flow is ascertained from the USGS topographic maps.

PHOTOGRAPHIC ANALYSIS

The Former Triumph Explosives Plant is located immediately northwest of Elkton, Cecil County, Maryland. The plant covers 470 hectares (1163 acres). Elevations range from approximately 34 meters (110 feet) above sea level along Blue Ball Road, North Bridge Street, and on several small hills to less than 3 meters (10 feet) at Little Elk Creek (USGS, 1992 and 1997). Surface runoff is directed into Little Elk Creek and Dogwood Run. Approximately 1.5 kilometers (0.95 miles) to the south of the former explosives plant, Little Elk Creek empties into Big Elk Creek which forms the headwaters of the Elk River. See Volume 2 for the aerial photographs and interpretive overlays.

For discussion purposes, the former explosives plant is divided into three subareas (A, B, and C). Subarea A comprises the area east of Blue Ball Road. Subarea B is located west of Blue Ball Road and is also bounded by Little Elk Creek on the west and south and by Dogwood Run on the south. Subarea C is located in the southern part of the plant bounded by Little Elk Creek and Dogwood Run on the north, a railroad line, West Pulaski Highway, and Nottingham Road on the south.

Several conventions are also used in this report. These are listed and described below.

Building Complexes - The text of the aerial photographic analysis is organized around the groups or complexes of buildings or a grouping of berms (with or without structures). Building complexes are annotated as BC. When activity is first observed at each of these building complexes, a numerical designator is assigned. These numbers are assigned sequentially regardless of subarea. The numbers are not assigned when activity is observed outside the boundaries of the former explosives plant. For the first year a building complex is identified, a brief description of the building complex layout, road network, and its geographic location is provided; however, no explanation is given

concerning access. In addition, within each subarea, these building complexes are discussed in order of numerical designation rather than by geographic location. Significant changes or additions to the complex will be described in the text when deemed appropriate. Individual buildings may be annotated for discussion purposes.

Berms - During the course of this analysis, numerous circular- and square-shaped earthen berms or walls (described in the text as berms) were identified. Berms completely enclosing or partially enclosing a structure (shed or small building; no distinction made in the analysis) are annotated on the overlays with an asterisk (*). The pound symbol (#) is used to represent a berm without an associated structure. A tally of these berm types are provided in the text for each applicable analysis year.

Ground scars, disturbed ground, light-toned material, and cleared areas - Ground scars (GS), disturbed ground (DG), light-toned material (LTM), and cleared areas (CA) are noted at times in close proximity to many of these earthen berms and within the building complexes. However, because of the limitations associated with the scale of the prints, only the largest of these features in terms of areal extent are annotated and discussed in the text.

Dirt roads and trails - Dirt roads and trails are annotated on the overlays and explained in the text when they extend into features of interest.

Smokestacks - Smokestacks are understood to be attached to a building unless otherwise explained in the text.

Overhead Pipelines - Overhead pipelines associated with individual buildings and storage tanks are observed from 1942 through 1999. These pipelines will be noted in the text, but not annotated on the overlays.

Enclosed Passageways - From 1942 through 1969, numerous enclosed passageways were observed. These passageways were likely used to transport materials between buildings. These features are not annotated on the overlays or discussed in the text.

Drainage - Drainages are annotated on the overlays when visible, but will not be described in the text.

Building Foundations - Numerous building foundations are observed throughout the analysis; however, although these features will be mentioned in the text, they will not be annotated on the overlays.

Vehicles - Vehicles and large transportation trailers indicating an active building complex are annotated on the overlays when observed, but are not discussed in the text.

Forested, Agricultural, and Residential Areas - Forested areas (FOR) and agricultural fields (AG) are noted throughout the analysis period. These land use features are only annotated on the overlay for 1938. Residential areas (RES), including farmsteads, are annotated on all analysis years. Unless for locational purposes, none of these land use features are discussed in the text.

Many of the figures in this report are mosaics of photographs. Photomosaicking is the process by which a set of photographic images--which collectively, but not individually, comprise a given scene or geographic area--are "stitched" or pieced together either by digital or mechanical techniques. Figures created using this procedure are documented when applicable.

MAY 2, 1938 (FIGURE 3)

Subarea A

BC-1 - Building Complex-1 (BC-1) is located west of North Bridge Street in the northwestern part of the subarea and comprises numerous buildings, sheds, and several roads. The larger buildings are located along North Bridge Street and the smaller buildings and sheds are to the west. A dark-toned (DT) circular-shaped (CIR) area, small patches of disturbed ground (DG), ground scars (GS), and numerous trails (not annotated) are observed. The trail to the east of the complex extends to a patch of disturbed ground. Southwest of this complex is a large possible burn area west of Dogwood Run, which is likely associated with agricultural activities.

BC-2 - Building Complex-2 (BC-2) is located in the southwestern part of the subarea on the east side of Blue Ball Road. The complex comprises numerous buildings, sheds, and an extensive road and trail network. The larger buildings are located near Blue Ball Road and the Dogwood Run. The sheds are noted to the southeast on the periphery of the complex. Two smokestacks (SS, not individually annotated) are located immediately southeast of the intersection of Blue Ball Road and Dogwood Run. A possible impoundment (IM) containing possible standing liquid (SL) is noted adjacent to Dogwood Run and dark-toned material (DTM) is visible to the south.

Subarea B

Subarea B is composed primarily of agricultural fields. No environmentally significant activity is observed.

Subarea C

A recent excavation (EX) area including bare soil (BS), and a probable excavation area with associated ground scars and standing liquid are noted on the east side of this subarea.

NOVEMBER 8, 1942 (FIGURE 4)

This photograph is a mosaic compiled from two individual photographs taken on the same day.

Because of the increased activity on the former explosives plant for this and on all subsequent analysis years, three figures are included. The first of the three figures includes the full extent of the plant, and an overlay detailing an index that displays the areal coverage boundaries of the two photographic enlargements that follow. The enlargements divide the plant into east (Subarea A) and west (Subareas B and C) areas using north-south oriented Blue Ball Road to separate the former explosives plant.

This photograph does not cover the entire explosives plant and full stereo coverage was not available: specifically, the extreme south-central part of Subarea C is not covered.

NOVEMBER 8, 1942 (FIGURE 5)

Subarea A

BC-1 - Line 1 (labeled on this overlay only), oriented east-west and connecting Dogwood Run and North Bridge Street has been drawn on the overlay to delineate the southern extent of this complex from building complex BC-2. Building complex BC-1 has expanded to the south and west since 1938. A circular-shaped pit containing dark-toned material is noted and is now surrounded by a wall. Possible stains (ST), several new roads and dirt roads, as well as a possible buried pipeline appearing to connect two buildings (B) are now observed. Three new structures surrounded by berms (annotated as *) are located in the forest (not annotated) on the east side of Dogwood Run. A wall or possible overhead pipeline connects several of the buildings in the southwestern part of the complex. A possible construction area containing dark-toned mounded material, a possible open storage area (OS) containing unidentified objects (UO) and disturbed ground are also noted nearby. A possible overhead pipeline connects two buildings along North Bridge Street. Dark-toned mounded material (DTMM; possibly coal) is also observed, suggesting power or steam generation is taking place at an adjacent building. To the east is a new elevated storage tank (ELEV TK).

BC-2 - Since 1938 this building complex has expanded eastward to North Bridge Street and now includes multiple roads and walkways. The buildings and sheds in the western part of the complex remain tightly grouped, while the new buildings and structures partially surrounded by berms in the central part of the complex, and the buildings in the eastern part of the complex are spaced farther apart. The possible impoundment containing standing liquid and patches of dark-toned material remain noted. An elevated storage tank, one mound of dark-toned material, two possible pits containing dark-toned material, several other areas of dark-toned material, and dark-toned unidentified objects are noted throughout this building complex.

BC-3 - New Building Complex-3 (BC-3) is located in the northeast part of Subarea A east of North Bridge Street. One road connects widely spaced buildings and the four structures partially surrounded by berms. A collection of tightly packed, dump-truck-sized mounds of uniform dark-toned material and a patch of disturbed ground are also visible. The disturbed ground is located in the same location identified on the 1938 photograph.

Northeast of Subarea A is an area of possible debris (DB). West of this subarea, along Blue Ball Road, is a building where dark-toned material is observed. A dirt road extends to the northeast from this building and terminates at a patch of disturbed ground located in a forested area (not annotated).

NOVEMBER 8, 1942 (FIGURE 6)

For this and all subsequent analysis years displaying subareas B and C, a second overlay is provided to delineate the boundaries of these subareas, as well as the limits of each of the building complexes located within the subareas.

A railroad line traverses subareas B and C. This railroad line is an extension of the main line which comprises a small section of the southern boundary of the explosives plant (partially visible on this photograph). This railroad line extends primarily west through Subarea C before curving to the north and crossing Little Elk Creek. North of the creek, the railroad line diverges into several rail spurs within Subarea B. These rail spurs parallel many of the new buildings in Building Complex-5 (BC-5). These spurs and the railroad line will only be annotated on this overlay. Changes or modifications to these features will be displayed on subsequent photographs, when deemed appropriate.

Subarea B

BC-4 - New Building Complex-4 (BC-4) is located in the northwestern part of Subarea B between Little Elk Creek and the northernmost railroad spur. The complex includes a road network and 14 structures partially enclosed by berms. Large ground scars are visible on the northeast side of the complex.

BC-5 - New Building Complex-5 (BC-5) is located in the center of the subarea and includes essentially all the railroad spurs and the buildings and roads in close proximity to them. The size of the buildings and their proximity to the railroad spurs indicates they are probably used for storage. The buildings in the western part of the complex are widely spaced. The eastern extent of this complex is bounded by a north-south oriented drainage ditch (annotated with arrows) which allows runoff (none observed) to empty into Little Elk Creek which defines the southern extent of the complex. An unnamed road (not annotated) is also observed on the east side of the complex, as are several railroad cars and probable emissions from a locomotive engine. A total of nine structures partially enclosed by berms are also noted. Two open storage areas (OS)

contain possible crates (CR) or lumber (LUM), and light-toned rectangular-shaped objects (LT RECT OBJS). A large cleared area (CA) and possible ice are also observed.

BC-6 - New Building Complex-6 (BC-6) is located east of Building Complex BC-5, sharing a boundary with the previously described north-south oriented drainage ditch. This complex is also bounded by Little Elk Creek to the south and unnamed roads (not annotated) to the east. Numerous buildings, a total of 11 structures partially enclosed by berms, sheds, and an intricate network of roads and walkways are distributed throughout the complex. The buildings and structures in the western part of the complex are more closely packed than the buildings seen in the eastern part of the complex. Four of the five structures with berms located near Little Elk Creek are isolated from other buildings in this complex. Dark-toned mounded material (possibly coal) is noted immediately north of a building with two smokestacks. Two open storage areas are visible; one of which is located in the northern part of the complex, and contains possible crates or lumber, and the other in the southeastern part of the complex contains crates. In the southernmost extent of the complex is a trench extending to a patch of disturbed ground. In addition, an elevated storage tank is noted in the northern part of the complex.

BC-7 - New Building Complex-7 (BC-7) is located in the eastern section of Subarea B. Boundaries include Blue Ball Road to the east, Little Elk Creek and Dogwood Run to the south, and unnamed roads (not annotated) to the west. This complex is comprised of numerous buildings (one building with an attached smokestack in the southern part of the complex), sheds, six structures partially enclosed by berms dispersed throughout the complex, a partially enclosed berm without a structure (annotated as #), and a compact network of roads and walkways. The buildings in the northern and eastern parts of the complex are set more closely together than those in other parts of the complex. A large circular-shaped wall with a possible recessed base contains both light-toned material (LTM) and dark-toned material. Two groupings of individual dump-truck-sized mounds of medium-toned material (MTMM), a large area of dark-toned mounded material, two elevated storage tanks, and numerous rectangular-shaped objects are also observed throughout the complex.

West of Building Complex BC-5 are a possible trench (TR), a possible trench or trail near a large area of disturbed ground (accessed by a dirt road), and areas of probable ice/snow. A photographic anomaly which should not be mistaken for actual features of environmental significance, is also noted on this photograph.

Subarea C

BC-8 - New Building Complex-8 (BC-8) is located in the western part of Subarea C. The eastern part of this complex is comprised of numerous buildings (some connected by overhead pipes), several sheds, a possible open storage area containing light-toned unidentified objects, a cleared area, a road and walkway network, and trails. The western part of the complex (connected to the eastern part of the complex by a road; not annotated) includes dark-toned material and a trail that extends west and terminates at a patch of disturbed ground. A cleared area is also noted.

BC-9 - New Building Complex-9 (BC-9) is located in the north-central portion of Subarea C and is comprised of several buildings, sheds, and several roads and walkways, and several walls (not annotated). In the central part of the complex, a well-defined trench extends northeast from a building (not annotated) and connects with Little Elk Creek. A road (not annotated) extends east from this complex, crosses the creek, and provides access to Building Complex BC-7.

Southeast of Building Complex BC-9 and across the railroad line is a probable excavation area, parts of which are covered with probable ice/snow.

MARCH 12, 1947 (FIGURE 7)

This photograph covers the entire explosives plant and delineates the limits of Figure 8 (Subarea A) and Figure 9 (Subareas B and C).

MARCH 12, 1947 (FIGURE 8)

Subarea A

BC-1 - This building complex has not changed appreciably since 1942. However, a new building is noted in the forested area (not annotated) in the northwestern part of the complex, and a probable trench is now observed extending to the west from North Bridge Street. The walled circular-shaped pit containing dark-toned material, the elevated storage tank, the possible overhead pipeline, and trails remain visible. A total of five structures enclosed by berms are now located in the forest near Dogwood Run. In close proximity to these structures are nine dark-toned rectangular-shaped objects. Areas of dark-toned material, disturbed ground, ground scarring, and a large, rectangular-shaped possible building foundation are also noted within this complex.

BC-2 - Several small buildings have been added to this building complex since 1942. East of Blue Ball Road the elevated storage tank remains visible and a possible conveyor or an overhead pipeline is observed near a building with three probable smokestacks. Eight structures partially surrounded by berms and three berms without structures are now noted, most of which are concentrated in the western part of this complex. Patches of dark-toned material, debris, ground scars (one ground scar is noted near Blue Ball Road north of the building complex boundary), disturbed ground, and a possible construction area are also visible in this part of the complex. In the eastern part of the complex are disturbed ground, a building, and possible impoundment containing possible standing liquid. Between these two features is a linear ground scar.

BC-3 - Five structures partially enclosed by berms are now visible at this complex where in 1942, four were noted. The placement of the new structure and berm in the northeastern corner of the complex is consistent with the existing wide-spacing layout of the complex. A ground scar is located along the road (not annotated) where disturbed ground was identified in 1942. An excavated area containing possible standing liquid is observed in the center of the complex.

Southeast of Subarea A, east of North Bridge Street and south of the railroad line, are four possible horizontal storage tanks (HT).

MARCH 12, 1947 (FIGURE 9)

Subarea B

BC-4 - All fourteen structures located within the berms seen on the 1942 photograph have been removed. In many cases, small rectangular-shaped ground scars are visible within these berms which remain where they previously were located. In addition, six new berms with no visible structures have been constructed at this complex. Light-toned material (possible bare soil; not annotated) surrounds many of the berms. A ground scar is also noted on the north side of this complex.

BC-5 - Several large buildings have been removed since 1942; dark-toned material is observed on several of the remaining building foundations. In addition, an irregularly shaped patch of dark-toned material (probable vegetation; VEG) is visible adjacent to a road (not annotated) in the north-central part of the complex. Four of the nine structures located within the berms on the 1942 photograph have been removed; although, the berms remain. The large cleared area in the south-central part of the complex remains evident. Dark-toned material is now noted adjacent to the ledge which forms the northern limit of the cleared area. Also visible is a grouping of circular-shaped ground scars.

BC-6 - Many of the buildings seen in 1942 have been removed leaving areas of debris, dark-toned material, ground scars, and building foundations scattered throughout the complex. A total of 17 structures partially enclosed by berms and six berms without structures are now visible. Near Little Elk Creek, dark-toned material is located in the center of two berms without structures. Two elevated storage tanks are now located at this complex.

BC-7 - Many of the buildings seen in 1942 have been removed leaving areas of debris, dark-toned material, ground scars, and building foundations scattered throughout the complex. A stand-alone smokestack and disturbed ground are evident in the southern part of the complex where, in 1942, a building (not previously annotated) was present. Ten structures partially enclosed by berms are dispersed throughout the complex, and seven partially enclosed berms without structures are now also observed.

The elevated storage tank and the large circular-shaped wall remain evident. The base of this circular structure is composed of light-toned material and is possibly recessed.

BC-10 - New Building Complex-10 (BC-10) is located in the southwestern portion of Subarea B. The buildings, nine structures partially enclosed by berms, and the roads and walkways that comprise the complex are all evenly spaced. To the north are two mounds of material (MM) possibly covered with vegetation. In the western part of the complex are a small patch of disturbed ground and the well-defined dirt road (seen in 1942) that extends northwest from the road network and terminates near Little Elk Creek. At the terminus of this road, a large area of disturbed ground was noted on the 1942 photograph, however, no significant activity is noted on this photograph.

Subarea C

BC-8 - This building complex has expanded in areal extent since 1942. Two new railroad spurs have been constructed and connect this complex to Building Complex BC-5 to the north. Eleven new structures partially enclosed with berms are now present north of the railroad line (not annotated) in the northeastern part of the complex. In addition, several large cleared areas and ground scars are also noted. In close proximity to a new building at the terminus of the north-south oriented railroad spur are a possible impoundment and a pad containing unidentified objects (possible transformer pad). A possible construction area, and large area of disturbed ground which includes dark-toned objects, crates, and possible light-toned mounded material are also noted in the vicinity of the rail spur. In the far-western part of the complex, two berms without structures are located at the terminus of a dirt road (not annotated). North of the dirt road are two areas of disturbed ground and possible trenches. The southernmost of these two areas is accessed by a dirt road which does not appear to be frequently utilized. No access is observed extending to the northernmost area of disturbed ground near Little Elk Creek. Southeast of this complex and adjacent to West Pulaski Highway is a large cleared area with a small building (not annotated).

BC-9 - This building complex has not changed appreciably since 1942. A small patch of dark-toned material and a dirt road extending east from the complex terminates at a small area of disturbed ground.

Southeast of Building Complex BC-9 is a patch of light-toned material and across the railroad line are mounds of light-toned material.

APRIL 11, 1952 (FIGURE 10)

This photograph is a mosaic compiled from two individual photographs taken on the same day. It covers the entire explosives plant and delineates the limits of Figure 11 (Subarea A) and Figure 12 (Subareas B and C).

APRIL 11, 1952 (FIGURE 11)

Subarea A

BC-1 - This building complex has not changed appreciably since 1947. The five structures surrounded by berms, the walled circular-shaped pit containing dark-toned material, the elevated storage tank, and dirt roads remain visible. An area of dark-toned material, and unidentified objects are noted near the elevated storage tank. Debris (located on a building foundation), several building foundations, dark-toned material, and ground scars are also observed.

BC-2 - This building complex has not changed appreciably since 1947. The elevated storage tank, a possible overhead pipeline/conveyor, and three smokestacks (annotated as probable in 1947) remain noted and a new possible overhead pipeline/wall is observed. Eight structures partially surrounded by berms, not all of which are situated in the same location as noted in 1947, and only one berm without a structure are now visible. Disturbed ground, dark-toned material, ground scars, dark-toned mounded material, light-toned material, light-toned mounded material, light-toned objects, and probable mounded material are all observed at various locations within this complex.

BC-3 - This complex has not changed appreciably since 1947. The five structures partially enclosed by berms remain visible. Dark-toned material is now observed at the excavated area in the center of the complex.

West of Subarea A and across Dogwood Run are four circular-shaped possible pits; the two northernmost of which are adjacent to one another. At the center of each possible pit is dark-toned material. Faint trails (not annotated) extend west for a short distance from the northernmost pair of possible pits, while no access is discernible to the southernmost possible pits. South of Subarea A, near the intersection of Elkton Road and North Bridge Street, are a probable stain and light-toned material. Further south and across the railroad line are numerous horizontal storage tanks.

APRIL 11, 1952 (FIGURE 12)

Subarea B

BC-4 - One structure partially surrounded by a berm and sixteen berms without structures are now visible at this complex. The centers of four of the berms contain light-toned material. Dark-toned material is observed in several locations, the largest (only one annotated) of which is located in the former location of berms. Ground scars are also present within the complex.

BC-5 - Four structures partially enclosed by berms and five berms without structures are now visible. An impoundment (without liquid visible), three probable horizontal storage tanks, a possible vertical storage tank (VT), probable and possible stains, numerous small patches of dark-toned material (one within a building foundation), dark- and light-toned mounded material, and dark-toned material with unidentified objects are also noted at this complex.

BC-6 - Most of the buildings seen at this complex in 1947 remain visible. Fifteen structures partially enclosed by berms and five berms without structures are now located throughout this complex. Only one of the two elevated storage tanks seen in 1947 remains. A large pile of mounded debris, ground scars, disturbed ground, building foundations, dark-toned material, and light-toned material remain scattered throughout the building complex.

BC-7 - Most of the buildings, the large circular-shaped wall with a possible recessed base comprised of dark-toned material, the elevated storage tank, the stand-alone smokestack, and disturbed ground seen in 1947 remain visible. Seven structures partially enclosed by berms and six partially enclosed berms without structures are apparent. Building foundations, ground scars, dark-toned material, dark-toned mounded material, light-toned material, and light-toned mounded material are all observed at this complex. In addition, unidentified objects, and a possible stain are noted in the center of this complex.

BC-10 - Nine structures partially enclosed by berms remain apparent at this building complex as they were situated in 1947. In the northwestern part of the complex adjacent to Little Elk Creek, a possible waste disposal area (WDA; annotated as WDA-1) is noted at the terminus of a dirt road. Just to the south is a ground scar where in 1947, disturbed ground was identified. In the agricultural field (not annotated) to the east is a total of three mounds of dark-toned material. Possible standing liquid, unidentified objects, and dark-toned material are also noted at this complex. A photographic anomaly is also visible. This anomaly should not be mistaken for features of environmental significance.

Subarea C

BC-8 - In the far-western part of the complex, near the terminus of a dirt road, are probable waste disposal area WDA-2 and possible waste disposal area WDA-3 (five light-toned patches; not individually annotated). North of the dirt road is a ground scar where, in 1947, a possible trench was noted. South of the dirt road is waste disposal area WDA-4. Its significant areal extent and access by a well-defined dirt road (not annotated) suggest this disposal area has been active for several years. In close proximity to the disposal area are dark-toned material, a cleared area, and three mounds of light-toned material. In the central part of the complex are an impoundment containing standing liquid, the pad containing unidentified objects (possible transformers), five horizontal storage tanks, a vertical storage tank, possible staining, light- and dark-toned material, a collection of unidentified objects and possible debris, and several building foundations. In the eastern part of the complex is possible waste disposal area WDA-5, dark-toned material, a berm (the structure from which has been removed), and a structure enclosed by a berm. To the northwest, near Little Elk Creek, the nine structures partially enclosed with berms seen in 1947 remain visible.

BC-9 - An elongated mound of material covered with possible vegetation, a depression containing dark-toned material, and several small patches of light-toned material are noted at this building complex.

South of building complex BC-9 and adjacent to West Pulaski Highway are a collection of debris, possible solid waste (SW), and probable stains. To the east is a construction area, and just south of the subarea boundary are two mounds. The first mound is composed of dark-toned material, and the second of medium-toned material. Further east, near the intersection of Blue Ball Road and the railroad line are probable debris within Subarea C. To the south, outside the subarea boundary are areas of staining, light-toned material, and light-toned mounded material.

AUGUST 13, 1957 (FIGURE 13)

This photograph is a mosaic compiled from two individual photographs taken on the same day. It covers the entire explosives plant and delineates the limits of Figure 14 (Subarea A) and Figure 15 (Subareas B and C).

AUGUST 13, 1957 (FIGURE 14)

Subarea A

BC-1 - Only one of the five structures surrounded by berms seen in 1952 remains visible; a dense forest canopy (not annotated) is likely obscuring the view of the other bermed areas. The walled circular-shaped pit containing dark-toned material, the elevated storage tank, and the dirt roads remain visible. Disturbed ground, ground scars, dark-toned material, light-toned material, a large building foundation, ruins (former building), and a cleared area are also visible.

BC-2 - The possible conveyor/overhead pipeline, elevated storage tank, and three smokestacks remain visible east of Blue Ball Road. Nine structures partially surrounded by berms are now observed scattered throughout the complex where eight were noted in 1952, and, the one berm without a structure seen in 1952 cannot be identified. Near Dogwood Run is a grouping of numerous square-shaped (SQ) objects, some of which are approximately the same size as the structures visible within the berms. Grounds scars, dark-toned material, dark-toned mounded material, a possible stain, a cleared area and building ruins are also noted at this complex. Along Blue Ball Road, just north of this complex is probable debris.

BC-3 - This building complex has not changed appreciably since 1952. The five structures partially enclosed by berms remain visible. Vegetation is observed within the excavated area, indicating no recent activity. A ground scar with unidentified objects and an area of light-toned mounded material are observed to the northwest. Immediately southeast of this building complex is a large construction area.

South of Subarea A, near the intersection of Elkton Road and North Bridge Street, are possible and probable stains and light-toned material. Further south across the railroad line, numerous horizontal storage tanks remain visible.

AUGUST 13, 1957 (FIGURE 15)

Subarea B

BC-4 - A significant amount of activity has occurred at this building complex since 1952. Four structures partially enclosed by berms, and twenty-five berms without structures are now visible. Some of the original berms and interior sections where structures would be located are covered with dense vegetation (not individually annotated), indicating no recent activity. Numerous ground scars and light-toned material (probable soil; not annotated) are present surrounding many of the new berms, suggesting recent construction.

BC-5 - Activity appears to have increased at this complex since 1952 Numerous railcars and tankers are noted in close proximity to the buildings (features not annotated). Also near the buildings are two vertical storage tanks, two possible vertical storage tanks, the impoundment noted in 1952 which now contains standing liquid, probable and possible stains, unidentified objects, an open storage area containing dark-toned objects, patches of dark- and light-toned material, vegetated light-toned mounded material, disturbed ground, and ground scars. Three structures partially enclosed by berms and five berms without structures, four of which are densely vegetated, are now visible.

BC-6 - The northern, central, and eastern parts of this building complex appear inactive. The elevated storage tank, a possible pit, building foundations, primarily located in the northern part of the complex, a possible mound of material covered with vegetation, identified as debris in 1952, and building ruins that includes debris, possible stains, and dark-toned material are observed. Six berms without structures are noted, five of which are densely vegetated. Only one of the fifteen structures partially enclosed by berms seen in 1952 is now visible. Numerous ground scars are located in the former location of many of these berms and structures, indicating that they have been removed.

BC-7 - The large circular-shaped wall with a recessed base is now identified to be a large, partially buried tank (not annotated) which is being utilized as a liquid treatment facility. The elevated storage

tank, stand-alone smokestack, and disturbed ground seen in 1952 remain visible within the building complex. In addition, probable debris is located near the smokestack. Activity appears to have increased in the central part of the complex. Probable stains and two areas of dark-toned material (one area is possible standing liquid) are noted. Only one of the seven structures partially enclosed by berms, and three of the six partially enclosed berms without structures seen in 1952 are visible. All four of these bermed features are partially vegetated, indicating no recent activity. Other locations where berms and berms with structures were noted in 1952 either are completely covered with vegetated and not discernible, or have been removed. This removal process has resulted in numerous ground scars. Many building foundations also remain noted at this complex.

BC-10 - Nine structures partially enclosed by berms and only one of the three mounds of dark-toned material seen in 1952 remains apparent at this building complex. The dirt road extension remains apparent in the northwest part of the complex, and it terminates at an area of disturbed ground (annotated as possible waste disposal area WDA-1 in 1952). A cleared area is now noted adjacent to this dirt road.

Subarea C

BC-8 - In the western part of this building complex is a new, extensive waste disposal area (WDA-6) which is accessed from the east by a well-defined dirt road (not annotated). This dirt road is also noted extending west from the disposal area and terminating near the forest. Near this disposal area are numerous ground scars, two of which are inactive probable waste disposal area WDA-2 and possible waste disposal area WDA-3 seen in 1952. In the central part of the complex are seven horizontal storage tanks, a total of three possible horizontal storage tanks, the impoundment containing standing liquid, a vertical storage tank, possible and probable stains, the pad containing unidentified objects (possible transformers), an open storage area containing probable crates, light-toned material, light-toned mounded material, dark-toned material, disturbed ground, ground scarring, a conveyor/overhead pipeline, and a dirt road. This dirt road terminates in the forest near Little Elk Creek. In the eastern part of the complex are a cleared area

and a new dirt road. At the terminus of this dirt road is possible waste disposal area WDA-7. Possible waste disposal area WDA-5 seen to the west in 1952 is no longer active. In the northern part of the complex, four structures partially enclosed by berms and a berm without a structure are visible; all of which are now partially vegetated. The former locations of the four berms with structures seen in 1952 are densely vegetated (not annotated) and not discernible on this photograph. This vegetation cover suggests they have been inactive for several years.

BC-9 - This building complex appears to be inactive and no features of environmental significance are observed.

South of Building Complex BC-9 and adjacent to West Pulaski Highway are possible stains and a location containing disturbed ground, light- and dark-toned material, and possible debris. South of the highway and the subarea is an area of light-toned mounded material. Further east and outside the boundary of the subarea is ground staining.

APRIL 8, 1969 (FIGURE 16)

This image is a mosaic compiled from eight individual photographs taken on the same day. It covers the entire explosives plant and delineates the limits of Figure 17 (Subarea A) and Figure 18 (Subareas B and C). A large excavation area is observed in the northeast section of this photograph.

Due to an increase in activity, excellent film resolution which allows for a greater number of feature identification, and space limitations for annotations, it was not possible to annotate each individual feature. Many features are described in the text as being part of, or near a subgroup of, buildings within the given complex. This type of feature annotation and text description will be employed throughout the remainder of this report, when deemed necessary.

APRIL 8, 1969 (FIGURE 17)

Subarea A

BC-1 - A building south of the elevated storage tank is in ruins; the surrounding area is darkened, probably resulting from fire damage, and debris covers a wide area around the ruins. A dirt road extends west from near these ruins. Adjacent to this dirt road are numerous piles of solid waste, debris, and light- and dark-toned material. South of the destroyed building are additional solid waste deposits, debris, and stained ground. Other buildings have collapsed (ruins; not all annotated) and roofs of many of the buildings are in disrepair (not annotated). The five structures surrounded by berms last observed in 1952 in the western part of the complex are again visible; a dense forest canopy in 1957 obscured identification of most of these bermed features. Small buildings remain evident in the western and northern parts of the complex, although the dirt roads previously identified as providing access to these buildings are now partially covered with grass (not annotated); suggesting that this part of the complex is mostly inactive. Ground scars, overhead pipes connecting several buildings, and the walled circular-shaped pit containing dark-toned material remain noted.

BC-2 - This building complex does not appear to be active. Several of the buildings are in ruins and the roofs of several buildings are in disrepair (not annotated). The surface of the road network is partially covered with grass (not annotated), indicating infrequent usage. Near Blue Ball Road, the elevated storage tank remains visible, although only one of the three smokestacks seen in 1957 remains visible. The nine structures partially surrounded by berms continue to be noted; however these features are densely vegetated (not annotated), suggesting they have not been utilized for several years. The collection of numerous square objects seen near Dogwood Run remain, but these objects now appear to be weathered. Also observed throughout the complex are a building foundation, a probable stain, light-toned material, debris, and possible debris, and several patches of dark-toned material, one of which is a possible burn area.

BC-3 - This building complex is inactive. All of the structures within the berms seen in 1957 have either been removed or are in ruins. Several piles of debris and light-toned material are observed along the dirt road (not annotated), which is now partially covered with grass (not annotated). South of this building complex, a school has been constructed since 1957.

West of Subarea A, across Dogwood Run, are a solid waste pile and two areas of debris in the residential area. At the terminus of a residential road (not annotated) northwest of the subarea is a broad area which includes derelict vehicles (DER VEH), solid waste, and debris. An excavation area and debris are also visible nearby.

South of Subarea A, along North Bridge Street and north of the railroad line are numerous buildings engaged in light industry. Other features in this location include a total of approximately 25 drums (DR), as well as possible drums, probable and possible solid waste, stains, probable stains, two impoundments containing standing liquid, a horizontal storage tank, a probable horizontal storage tank, nine vertical storage tanks connected by an overhead pipeline, an elevated storage tank, debris, dark-toned material, light-toned material, light-toned mounded material, and an open storage area containing numerous spools for cable or wire products. South of the railroad line, numerous horizontal storage tanks remain visible. Near these tanks are approximately 60 drums and very dark ground stains. Solid waste and a vertical storage tank are also observed.

APRIL 8, 1969 (FIGURE 18)

Subarea B

BC-4 - Seven structures partially enclosed by berms, and twelve berms without structures are now visible. In the center of one of the berms without a structure are 16 drums. A second of these features is being utilized as a waste disposal area (WDA-8a), which also contains possible standing liquid and light-toned unidentified objects. Five of the berms without structures are covered with dense vegetation, indicating no recent activity. Ground scars indicate where many of the berms visible in 1957 have been removed. Three trenches and an excavation area are also visible at this complex.

BC-5 - Numerous railcars and tankers (neither feature annotated) are noted in close proximity to the buildings. Three separate subgroups of buildings comprise this complex, one each in the northwest, the northern, and the southern part of the complex. At the northwestern subgroup of buildings there are approximately 150 drums, a waste disposal area (WDA-9), six vertical storage tanks, four horizontal storage tanks (two tanks each at two separate locations), standing liquid (possible leakage from one of the sets of horizontal storage tanks), ground stains, and ground scars. Just to the east are another horizontal storage tank and an open storage area consisting of stacked probable pipes. At the northern subgroup of buildings there are three vertical storage tanks, a horizontal storage tank, ground stains and possible ground stains, dark-toned material, an open storage area containing dark-toned objects, debris, and ground scars. Four densely vegetated berms without structures are noted to the north and do not appear to have been recently utilized. At the subgroup of buildings in the southern part of the complex there are approximately 160 drums, ground stains, possible solid waste, debris, dark-toned material, a pit which contains dark-toned objects (indicating possible burial activity), and several mounds covered with vegetation. The berms with and without structures noted in this part of the complex in 1957 are no longer visible.

BC-6 - A new subgroup of buildings has been constructed in the northern part of the complex. Approximately 20 drums, an open storage area containing crates and containers (CONT) are noted near this new subgroup of buildings. The elevated storage tank seen on previous photographs and three vegetated berms without structures are also observed in this location. At the subgroup of buildings in the southwestern part of the complex there are probable stains, debris, possible drums, and an open storage area containing linear objects. Also noted are two pits and a trench, debris, ground scars, and light-toned material. In addition, a new raised, bermed impoundment containing standing liquid has been constructed. The source of the liquid within the impoundment is not evident on this photograph. A drainage channel located north of the impoundment diverts runoff (none observed) around the north and west sides of the impoundment and toward Little Elk Creek.

BC-7 - Numerous new buildings have been constructed at this complex since 1957 including a subgroup of buildings in the north. Near this subgroup of buildings are approximately 110 drums, as well as probable and possible drums, stains, debris, dark-toned material, ground scars, and a new impoundment containing standing liquid. A well-defined drainage ditch extends west from a building and terminates at the impoundment. The large circular-shaped tank also remains; in 1957 this feature was described as a liquid treatment facility. No liquid is presently visible within the tank, however. In the central part of the building complex, the elevated storage tank remains visible and an open storage area is observed containing probable cylindrical-shaped (CYL) objects, stains, and probable stains. Also noted nearby are dark- and light-toned material. To the southeast is an extensive area of ground scars and small debris piles. A second, smaller area of debris piles, and dark-toned material, building foundations, possible stains, and three partial berms without structures are also visible. Near the subgroup of buildings in the extreme southern part of the complex there are approximately 140 drums, stains, probable solid waste, and debris. West of the buildings is a new, broad-based waste disposal area (WDA-10). Striations on the ground surface of this waste disposal area indicate waste materials are being pushed with heavy equipment (none annotated) in a southerly direction toward Little Elk Creek. This activity has formed a steep ledge at the southern and southwestern limits of this disposal area.

BC-10 - This building complex has expanded since 1957 and new subgroupings of buildings and a construction area are now visible. Large earthen berms partially surround one new building in the northern part of the complex. Near this new subgroup of buildings are a vertical storage tank, a total of seven possible horizontal storage tanks, and an overhead pipeline which connects several of the buildings. Numerous large cylindrical-shaped objects are also visible. In the northwestern part of the complex near Little Elk Creek is a large curved berm which is accessed by a well-defined dirt road (not annotated). The location, configuration of the berm, and the darkened surface material (not annotated) on the western side of the berm indicates a burn area. Also noted in the vicinity are disturbed ground and light-toned material. In the southern part of the building complex, there are overhead pipelines, a vertical and a horizontal storage tank, probable stains, possible drums, crates, and ground scars. A large horizontal storage tank is separate from the complex and a berm shields the tank on its east side. Thirteen berms partially enclosing structures, and one berm without a structure are now visible.

Subarea C

BC-8 - In the western part of the building complex is an extensive area of light-toned material, which includes two large pits in which dark-toned material is visible. In 1957 this location was an active waste disposal area (WDA-6). Debris and unidentified objects are noted at the southern extent of this area of light-toned material. Adjacent to the northwest corner of this area is a small pile of solid waste and, to the west, a faint trail terminates at a second pile of solid waste. South of the light-toned material is the ground scar. In the central part of the complex there are vertical and horizontal storage tanks, an elevated storage tank, two impoundments containing standing liquid, an excavation area, stains, debris, probable debris, two structures partially enclosed by berms, light-toned mounded material, overhead pipelines, transformer pads (TP), disturbed ground, ground scars, and two open storage areas containing possible drums, probable stains, crates, and containers. In the eastern part of the complex there are three additional structures partially enclosed by berms; two of which are noted at the terminus of the dirt road noted in 1957. Near the isolated structure and berm is a

small pile of solid waste. Also visible alongside the dirt road are a small pile of debris and a ground scar where, in 1957, a possible waste disposal area (WDA-7) was noted, but is no longer active. In the northern part of the complex is a possible stain.

BC-9 - This building complex is inactive and no features of environmental significance are observed.

In the south-central portion of Subarea C there are areas of debris and possible and probable piles of solid waste located on the north side of the buildings along West Pulaski Highway. A dirt road is observed leading from a building to one pile of probable solid waste. To the east are dark-toned mounded material, a large pool of standing liquid, stains, and possible drums. Near the intersection of State Route 279 and West Pulaski Highway are a staging area with crates, containers, lumber, and numerous mounds of material and an impoundment containing standing liquid. Northeast of the staging area, along State Route 279, are light- and medium-toned materials. In the southeastern corner of Subarea C is an electric (ELEC) substation.

Southwest of Subarea C there are several light-industrial operations. Visible at this collective grouping of operations are numerous storage tanks, stains, debris, probable solid waste, an impoundment containing standing liquid, lumber products, and light-toned mounded material (features are not individually annotated). Southeast of Subarea C, south of the railroad, there are a pile of debris and possible solid waste, and an industrial facility (not annotated) where numerous storage tanks connected by overhead pipelines, possible drums, ground stains, debris, and possible solid waste are visible.

SEPTEMBER 16, 1979 (FIGURE 19)

This photograph covers the entire explosives plant and delineates the limits of Figure 20 (Subarea A) and Figure 21 (Subareas B and C). However, full stereo coverage was not available for this analysis year.

SEPTEMBER 16, 1979 (FIGURE 20)

Subarea A

BC-1 - Several buildings remain visible alongside North Bridge Street near the elevated storage tank; however, this building complex, when compared to previous years of the analysis, does not appear to be active. Several trails (not annotated; previously identified as dirt roads) are visible through the forest canopy (not annotated), but they do not appear to be frequently utilized. In addition, the three berms with structures seen in 1969 are no longer visible, possibly due to dense vegetation. Ground scars, probable ruins, light-toned material, and unidentified objects are noted throughout the complex. A photographic anomaly is also visible and should not be mistaken for actual features of environmental significance.

BC-2 - This building complex is inactive. All of the buildings seen on previous photographs have been demolished and removed, and the berms with structures seen in 1969 cannot be identified through the dense vegetation (not annotated). Numerous grounds scars, building foundations, and debris piles are visible. Dark-toned material is also noted on one of the building foundations.

BC-3 - This building complex is no longer active and is covered with dense vegetation (not annotated). Only a building foundation and ground scars are noted. South of this building complex is a school.

Northwest of Subarea A is a fill area (FA) and ground scarring. The area of derelict vehicles, solid waste, and debris seen in the 1969 photograph is no longer visible. South of the Subarea A, along North Bridge Street and north of the railroad line, there are several buildings engaged in light industry. A total of twelve vertical storage tanks, three probable horizontal storage tanks, an elevated storage tank, overhead pipelines, stains and possible stains, probable and possible debris, two impoundments containing standing liquid, a retention basin, and open storage areas containing crates, containers, and unidentified objects are observed. South of the railroad line, numerous horizontal storage tanks remain visible. Five vertical storage tanks, stains,

probable solid waste, and an open storage area containing unidentified objects are also noted. The drums noted in 1969 are not visible.

SEPTEMBER 16, 1979 (FIGURE 21)

Subarea B

BC-4 - Eleven structures partially enclosed by berms and one berm without a structure are visible at this building complex. Waste disposal area WDA-8a is no longer active; however, new probable waste disposal area WDA-8b is now active immediately north of the location of former waste disposal area WDA-8a. Ground scars and disturbed ground are also visible. Sections of this building complex are covered with a dense forest canopy (not annotated), possibly obscuring some or all of the features described in 1969.

BC-5 - Several new buildings have been added to each of the three separate subgroups of buildings that continue to comprise this complex. At the northwestern subgroup of buildings there are three possible horizontal storage tanks, probable stains, light-toned mounded material, mounded material covered with vegetation, and ground scars. At the northern subgroup of buildings there are six horizontal storage tanks, a total of five vertical storage tanks, ground stains, debris, disturbed ground, two large fill areas containing light-toned material, an open storage area containing unidentified objects and stains, and a cleared area. A railroad marshalling yard, including numerous railcars and tankers (neither feature annotated), is observed in the northern part of this subgroup. South of the marshalling yard is a new building used as a probable repair facility for railcars. At the southern subgroup of buildings there are two vertical storage tanks, an impoundment containing standing liquid, ground stains, ground scars, dark-toned material, light-toned material and two open storage areas, each containing crates. The area where berms without structures were seen in 1969 is densely vegetated (not annotated); thus, if present, these features are obscured.

BC-6 - At the subgroup of buildings in the northern part of the building complex there are a possible vertical storage tank, numerous stains, probable stains, and two open storage areas, each containing crates and unidentified objects. The elevated storage tank seen on previous photographs remains visible, but the three vegetated berms without structures are no longer evident and are likely obscured by dense

vegetation (not annotated). At the southwestern subgroup of buildings there are a possible horizontal storage tank, three possible vertical storage tanks, probable stains, medium-toned mounded material, possible crates, ground scars, and unidentified objects. To the east are four vertical storage tanks, three horizontal storage tanks, ground stains, and the raised, bermed impoundment containing standing liquid. As in the case of the 1969 photograph, the source of this liquid cannot be determined.

BC-7 - Near the northern subgroup of buildings in this complex, there are stains, debris, medium-toned mounded material, ground scars, and an open storage area containing possible crates and unidentified objects. The partially buried tank appears to be inactive and a nearby ditch is no longer visible. To the southeast are ground scars and dark-toned material. In the central part of the building complex, the elevated storage tank remains visible. Also noted in the vicinity of this subgroup of buildings are a vertical storage tank, seven possible horizontal storage tanks, stains, possible stains, ground scars, disturbed ground, dark-toned material, unidentified objects, ruins from a former building, and two open storage areas. One of these open storage areas contains possible crates and the other contains possible containers. In the southern part of the complex are building foundations and, adjacent to Dogwood Run, there are dark-toned material and unidentified objects. A ground scar and possible debris are observed near Little Elk Creek where, in 1969, an expansive waste disposal area (WDA-10) was visible. The nearby vegetation cover (not annotated) in this location suggests the waste disposal area has been inactive for several years.

BC-10 - Near the subgroup of buildings in the northern part of the complex, there are a probable horizontal storage tank, a possible vertical storage tank, an overhead pipeline, and the group of numerous probable cylindrical-shaped objects. Also visible are the large building with the surrounding berms, a total of seven structures that are partially surrounded by berms, disturbed ground and a possible impoundment. In the northwestern part of the complex, adjacent to Little Elk Creek, the probable burn area is again observed. The ground surface on the western side of the berm is composed of patches of medium- and

light-toned material (not annotated). In the southern part of the building complex, there are three berms partially surrounding structures, two berms without structures, two possible horizontal storage tanks, an overhead pipeline, possible debris, and ground scarring.

Subarea C

BC-8 - In the western part of the building complex, waste disposal area WDA-6 is again active. This disposal area is accessed by dirt roads from both the east and the south. Along the southern dirt road is new, probable waste disposal area WDA-11. East and southeast of waste disposal area WDA-6 are possible waste disposal area WDA-12 (this location was noted as an excavation in 1969) and a vertical storage tank, respectively. In the center of the building complex are a structure partially enclosed with a berm, an elevated storage tank, two possible horizontal storage tanks, an impoundment containing standing liquid, light-toned mounded material, dark-toned material, overhead pipelines connecting several buildings, ground scars, a cleared area, and probable transformer pads. To the east, adjacent to the forest (not annotated), waste disposal area WDA-5 is also again active. At the terminus of the dirt road in the forest (not annotated) to the east is a rectangular-shaped ground scar where, in 1969, two structures partially enclosed by berms were visible. Also visible alongside this dirt road are a small patch of light-toned material and a circular-shaped ground scar. Grass (not annotated) covers the ground surface of this ground scar, which is devoid of mature vegetation when compared to the adjacent forest. In 1957 a possible waste disposal area (WDA-7) was noted at this location. In the northern part of the complex are a circular-shaped wall which contains dark-toned material, and an impoundment which contains standing liquid.

BC-9 - This building complex is inactive.

In the south-central section of Subarea C, south of Building Complex BC-9 and adjacent to West Pulaski Highway, there are possible solid waste, debris, probable debris, an open storage area containing dark-toned objects and possible crates, two mounds composed of medium-toned material, light-toned mounded material, and a total of four impoundments

containing standing liquid. New waste disposal area WDA-13, and probable waste disposal area WDA-13 (the same numerical designation is assigned to both disposal areas because of their proximity to each other) are accessed via a dirt road which connects to State Route 279.

BC-11 - New Building Complex-11 (BC-11) is located at the far-eastern section of Subarea C. Its boundaries include Blue Ball Road, West Pulaski Highway, the railroad, Dogwood Run, and Little Elk Creek. A possible horizontal storage tank, a possible stain, unidentified objects, and a large area of partial vegetation are observed on the east side of this complex. Also noted is the electrical substation.

Southwest of Subarea C, along West Pulaski Highway there are several light-industrial operations. Visible at these operations are numerous possible storage tanks, stains, debris, possible solid waste, an impoundment containing standing liquid, light- and dark-toned material, and possible lumber products.

Southeast of Subarea C and south of the railroad there are numerous storage tanks connected by overhead pipelines, probable ground stains, dark-toned material, probable debris, and ground scars visible at an industrial facility. Just to the west of this facility is a horizontal storage tank.

MARCH 1, 1990 (FIGURE 22)

This photograph covers the entire explosives plant and delineates the limits of Figure 23 (Subarea A) and Figure 24 (Subareas B and C).

MARCH 1, 1990 (FIGURE 23)

Subarea A

BC-1 - This building complex is no longer active. The buildings and elevated storage tank seen in 1979 have been removed and much of this former complex remains forested (not annotated). Several dirt roads (not annotated) and medium-toned mounded material, possible debris, and a ground scar are noted.

BC-2 - Most of this former building complex remains covered with dense vegetation (forest; not annotated). In the southwestern part of the complex, there are two areas consisting of numerous mounds of material, vegetation, and small piles of debris. In addition, probable debris piles, mounded material covered with vegetation, building ruins, and several ground scars are visible throughout the complex. One of these ground scars is located near Line-1 which divides this complex from Building Complex BC-1 to the north. Access to this ground scar is via a dirt road which parallels Dogwood Run, extending northeast from Blue Ball Road. Several other dirt roads are visible connecting to former building locations, none of which are annotated.

BC-3 - This former building complex remains inactive and is covered with dense vegetation (forest; not annotated). One ground scar is noted. South of this former building complex, the school remains visible.

West of Subarea A are areas of possible solid waste, possible stains, debris, and a new junkyard is visible near the intersection of Blueball and Dogwood roads. Debris and stains are noted northeast of the junkyard. South of Subarea A there are several buildings engaged in light industry. Numerous vertical and horizontal storage tanks, an elevated storage tank, stains, probable and possible stains, debris, scrap lumber, two impoundments containing standing liquid, a retention basin, a former building in ruins (likely the result of fire), light-toned mounded material, and two mounds composed of medium-toned material are visible. In addition, several open storage areas are observed collectively containing crates, probable and possible crates, containers, spools, linear objects, dark-toned material, dark-toned objects, and unidentified objects.

MARCH 1, 1990 (FIGURE 24)

Subarea B

BC-4 - Ten structures partially enclosed by berms, a possible structure partially enclosed with a berm, and four berms without structures are now visible in this building complex. A ground scar is visible in the same location where, in 1979, probable waste disposal area WDA-8b was identified. This ground scar is partially vegetated, suggesting the probable waste disposal area has not been active for several years. A small excavation area is noted atop a ridge in the center of the complex.

BC-5 - Several new buildings (not annotated) have been added to this complex since 1979. At the subgroup of buildings in the northwest part of the complex, two structures partially surrounded by berms are now visible. Six possible vertical storage tanks or containers and dark-toned unidentified objects are also noted in this location. At the northern subgroup of buildings, there are three smokestacks, a total of seventeen vertical storage tanks, a possible saturated area (near a grouping of twelve vertical storage tanks), five horizontal storage tanks, a possible horizontal storage tank, overhead pipelines, numerous ground stains (many of which are adjacent to two vertical storage tanks), possible and probable ground stains, debris, light-toned mounded material, an open storage area which contains crates, and a building foundation surrounded by a berm, where dark-toned material is noted. The marshalling yard and probable repair facility (not annotated) seen in 1979 do not appear to be active. At the subgroup of buildings in the southern part of the complex, there are four vertical storage tanks, overhead pipelines, stains and probable stains, unidentified objects, and an open storage area containing crates. An area consisting of debris, possible solid waste, and a possible derelict storage tank is observed north of the buildings. No access is noted to this area, suggesting it has not been utilized for disposal activity in several years or, if it has, this activity is infrequent.

BC-6 - Several new buildings have been constructed at this complex since 1979. At the subgroup of buildings in the northern part of the complex, there are two vertical storage tanks, a probable horizontal storage tank,

possible stains, and ground scars. The elevated storage tank seen on previous photographs remains visible. At the subgroup of buildings in the southwestern part of the complex, there are numerous large spools likely used for wire or cable, several small mounds of material varying in both tone and texture (not annotated), ground scars, and debris. In the forest (not annotated) south of the buildings, a dirt road extends to a large cleared area. To the east along the Little Elk Creek are two large impoundments containing standing liquid. A small building (possible pumphouse; not annotated) and linear ground scar (possible buried pipeline; not annotated) are located south of this impoundment. The westernmost impoundment is recessed and receives liquid from several runoff channels to the north. The liquid in this impoundment is lighter in tone (not annotated) than that in the eastern impoundment. South of the impoundments are a building in ruins, two horizontal storage tanks, debris, and possible solid waste. East of the two large impoundments is a vegetated mound of material and further east, and adjacent to a new building are a smaller impoundment with standing liquid, three horizontal storage tanks, and an open storage area comprised of containers.

BC-7 - A vertical storage tank, two horizontal storage tanks, and two probable horizontal storage tanks are located near a new building in the northern part of this building complex. To the east are areas of possible solid waste, possible stains, mounded material covered with vegetation, an open storage area containing crates and unidentified objects, and the partially buried tank with a vegetated base. To the southeast are ground scars. In the central part of the building complex are the elevated storage tank and several cylindrical-shaped containers. Additional containers, crates, and unidentified objects are observed within an open storage area near Blue Ball Road. Probable stains, a possible vertical storage tank, and a possible horizontal storage tank are also noted in close proximity to the open storage area. To the west are dark-toned material, cylindrical containers, a ground stain, a horizontal storage tank, and unidentified objects.

BC-10 - Near the subgroup of buildings in the northern part of the complex, there are two possible vertical storage tanks, an overhead pipeline, the large building surrounded by berms, a total of seven structures that are partially surrounded by berms, and the probable burn

area partially surrounded by the curved berm. The surface materials immediately west of the berm are darkened and appear disturbed (not annotated). A small rectangular-shaped object, unidentified objects, and a small pile of medium-toned material (features not annotated) are also noted west of the curved berm. In the southern part of the building complex, there are a total of four structures partially surrounded by berms and two buildings partially or fully surrounded by berms. One of these buildings is new, and the second building (annotated as a structure and berm in 1979) now includes an addition, and is much larger when compared to its size in 1979. Also visible are four vertical storage tanks, a horizontal storage tank, and overhead pipelines. Possible stains, unidentified objects, probable standing liquid, mounded material, and a dirt road are also observed in this part of the building complex. The dirt road extends south from the building complex, where it terminates at a patch of dark-toned material.

Subarea C

BC-8 - In the western part of this building complex, the well-defined dirt road leads to the northwest where, a large ground scar and several small piles of light-toned material are visible. In previous years, this area had been used for large-scale waste disposal activities (WDA-6); however, this activity is no longer observed. Just to the east is an excavation area, where possible solid waste and debris are observed. South of the excavation area are a vertical storage tank, dark-toned material, and unidentified objects. To the east, near the main part of the building complex, there are an open storage area containing numerous unidentified objects, a possible derelict tank, and the elevated storage tank. Numerous overhead pipelines connecting several buildings and probable transformer pads (not individually annotated) also remain. In the eastern part of this complex, adjacent to the forest (not annotated), there is a ground scar. In 1979, waste disposal area WDA-5 was visible at this location. Also noted in this general vicinity are a pile each of light- and dark-toned material, two structures partially surrounded by berms, and a possible structure surrounded by a berm. Four additional structures partially surrounded by berms have been constructed in the northern part of the complex since 1979. Possible stains and medium-toned mounded material are noted near a building immediately to the east.

BC-9 - This building complex is inactive and no features of environmental significance are noted.

In the south-central section of Subarea C, just north of a building along West Pulaski Highway, there is a small area which contains stains, debris, and probable solid waste. To the east is a large area that has been cleared (not annotated) of vegetation since 1979. Within this cleared area, certain areas are being filled, likely in anticipation of future development. These fill materials include mounds of light-toned material and dark-toned material. Also noted are two possible derelict storage tanks, and an open storage area containing linear objects. Further east, near State Route 279 are the four impoundments containing standing liquid, debris, light-toned mounded material, medium-toned mounded material, and a fill area composed of numerous dump-truck-sized mounds of material. This fill area was an active waste disposal and probable waste disposal area (WDA-13) in 1979. Adjacent to the fill area is a pool of standing liquid.

BC-11 - Two retention basins (only one containing standing liquid), a vertical storage tank, debris, ground stains, and the electrical substation are observed.

Southwest of Subarea C, between Nottingham Road and West Pulaski Highway is a new fill area composed of medium-toned mounded material. Also noted nearby are light-toned mounded material, dark-toned mounded material, and a horizontal storage tank. On the south side of West Pulaski Highway are several light-industrial operations. Visible at these operations are the impoundment containing standing liquid, possible stains, a vertical storage tank, a probable horizontal storage tank, light-toned mounded material, medium-toned mounded material, possible debris, and crates. To the east, also on the south side of West Pulaski Highway, is an active fill area which contains probable solid waste.

Southeast of the intersection of State Route 279 and West Pulaski Highway, light-toned mounded material and medium-toned mounded material are noted.

At the industrial facility southeast of Subarea C and south of the railroad, there are numerous storage tanks connected by overhead pipelines, possible drums, and ground stains.

APRIL 13, 1999 (FIGURE 25)

This photograph covers the entire explosives plant and delineates the limits of Figure 26 (Subarea A) and Figure 27 (Subareas B and C). Earlier photographs taken on March 20, 1999, were also obtained for and used in this analysis; however, complete stereo coverage was not available for that date for Subarea C.

APRIL 13, 1999 (FIGURE 26)

In addition to the overlay displaying plant features and boundaries for this date, a separate overlay displaying approximate former locations of all berms with structures (*), and berms without structures (#) identified from 1942 through 1990 are provided with this figure. In cases when both asterisk and pound symbols are noted at the same location, but for different analysis years, the asterisk symbol is used to represent that a structure was observed within the berm.

Subarea A

BC-1 - Much of this former building complex remains forested (not annotated), although activity has increased since 1990. Light-toned material, a new elevated storage tank, a cleared area that is partially vegetated, dirt roads (not annotated), and three impoundments containing standing liquid are visible.

BC-2 - Much of this former building complex remains densely covered with vegetation (not annotated). The dirt road on the west side of the complex connects to another dirt road (not annotated) that is now part of building complex BC-1 to the north. A trail transects the northwest boundary of the former complex. Two piles of possible debris are noted, one of which is located on this trail and the other near residential homes adjacent to Blue Ball Road west of the subarea boundary where, light-toned material is also observed.

BC-3 - This building complex is again active. In the western portion of the complex, there are new residential or office buildings (not annotated) and construction activity. Large cleared areas and bare soil, connected by a dirt road, are visible in locations where berms with and without structures were last identified in 1969. Since that time, dense vegetation had obscured the ability to confirm the presence of these berms. Also noted is a possible retention basin; however, no liquid is observed within it. South of this building complex is the school.

West of Subarea A, along Dogwood Road, there are now two junkyards and an area of debris and possible ground stains. South of Subarea A, there are several buildings engaged in light industry adjacent to North Bridge Street and on both sides of the railroad line. In close proximity to these buildings are a vertical storage tank, a total of six probable vertical storage tanks, an elevated storage tank, and possible derelict tanks. In addition, a ground stain, several possible and probable stains, light-toned material, ground scars, and two impoundments containing standing liquid are also noted near these buildings.

APRIL 13, 1999 (FIGURE 27)

In addition to the overlays displaying plant features, and subarea and building complex boundaries for this date, a separate overlay displaying approximate former locations of the burn area, all waste disposal areas, and berms with structures (*), and berms without structures (#) identified from 1942 through 1990 are provided with this figure. In cases when both asterisk and pound symbols are noted at the same location, but for different analysis years, the asterisk symbol is used to represent that a structure was observed within the berm.

Subarea B

BC-4 - Eleven structures partially enclosed by berms and three berms without structures are now visible. Several of these bermed features described in previous years of this analysis likely remain covered with vegetation (not annotated) and thus, their presence cannot be confirmed. Bare soil is noted within the expanded excavated area. A small patch of disturbed ground is located where, in 1990, a building was visible.

BC-5 - Near the subgroup of buildings in the northwest part of the building complex, two structures partially surrounded by berms remain visible. Ground stains, ground scars, unidentified objects, and numerous probable containers are also noted. At the northern subgroup of buildings, there are four vertical storage tanks. The patch of stained ground surrounding a pair of tanks has increased in areal extent since 1990 as a result of probable leakage or spillage. An open storage area containing probable crates and probable stained ground is observed near the northernmost building (not annotated). Also noted are ground scars where, in 1990, a possible horizontal tank was observed. Several large buildings (including the probable repair facility noted in 1979) and numerous storage tanks have been removed since 1990. A tank pad, dark-toned material, unidentified objects, and building foundations remain visible. At the subgroup of buildings in the southern part of the complex, a smokestack and emissions (EM) are observed. Three vertical storage tanks, and a possible vertical storage with connecting possible overhead pipelines are also noted. A trail extends southwest from a pair of vertical storage tanks, terminating at a small patch of light-toned

material. Near a possible horizontal storage tank is a small pile of debris. Immediately southwest of this subgroup of buildings is an open storage area which contains probable crates or containers, dark-toned material, stains, and several small boats. To the east is light-toned mounded material.

BC-6 - This building complex has not changed appreciably since 1990. At the subgroup of buildings in the northern part of the complex, five vertical storage tanks are now apparent. A ground stain, large containers, and a building foundation are also noted. The elevated storage tank seen on previous photographs also remains visible. Near the subgroup of buildings in the southwestern part of the complex, there are three open storage areas. The northernmost open storage area contains possible pipes, and the southernmost area contains probable crates, probable stains, probable debris, ground scars, and unidentified objects. The westernmost open storage area is comprised of possible containers, ground scars, possible debris, and numerous unidentified objects. A larger ground scar, and trailers/containers are observed in close proximity to this western open storage area. To the east, just north of Little Elk Creek, only the easternmost of the two impoundments contains standing liquid. The westernmost impoundment is dry and contains vegetation (not annotated), suggesting it has not recently been used for liquid retention. However, several dark-toned patches (not annotated) are noted within this impoundment and likely represent saturated conditions. South of these impoundments, a new building (not annotated) has been constructed in the same location where, in 1990, ruins were identified. In close proximity to this building, there are possible stains, crates, and unidentified objects. Further east is a dry impoundment where, in 1990, standing liquid was visible.

BC-7 - Within the northern subgroup of buildings in this complex, there are three possible horizontal storage tanks, possible debris, light-toned material, dark-toned material, probable derelict vehicles, and ground scars. Several open storage areas in this location collectively contain possible stains, possible small crates or containers, linear objects and unidentified objects. In addition, large containers (possibly used for transportation), the partially buried tank with a vegetated base, and a recessed, dry impoundment are noted. A possible, concrete-lined

drainageway (annotated with a drainage arrow) extends south from the southwestern corner of a building and into the dry impoundment. In the central part of the building complex, there is an elevated storage tank, a building foundation, a ground scar, and several open storage areas that collectively contain small probable crates or containers, possible and probable stains, and unidentified objects. To the southeast two new buildings (not annotated) have been constructed since 1990. Ground scars and a dry retention basin are apparent in close proximity to these buildings. The base of the retention basin is darkened (not annotated) and represents possible saturated conditions (not annotated).

BC-10 - In the northern portion of the complex, numerous overhead pipelines now connect many of the buildings to the structures within the berms. Nine structures partially surrounded by berms are observed, including three new structures located in the northwestern part of the complex adjacent to Little Elk Creek. In 1969, this location was identified as a burn area. Six possible horizontal storage tanks, the large building surrounded by berms, and mounded material covered with vegetation are observed. In the southern part of this building complex the two buildings surrounded by berms, and the overhead pipelines connecting several buildings remain noted. Two structures partially surrounded by berms are observed, one of which has been constructed since 1990. Of the four vertical storage tanks seen that same year, only one remains visible. A bunker has been constructed since 1990 and likely encloses a small structure; however, this cannot be confirmed. The well-defined dirt road in the southern portion of the complex leads to an isolated, small building in the forest (not annotated). An unidentified object and a ground scar are also noted at this complex.

Subarea C

Full stereo coverage was not available in the southeastern section of this subarea for this analysis year.

BC-8 - In the western part of the complex, a small patch of light-toned material is noted along the dirt road. To the east, near the main section of the complex, there are the elevated storage tank, a vertical storage tank, a probable vertical storage tank, three possible horizontal

storage tanks, disturbed ground, and a ground scar. Numerous overhead pipelines connecting several of the buildings and probable transformer pads remain visible, as do the four structures partially surrounded by berms noted in 1990. In addition, a bunker is apparent in the same location where in 1990, a fifth structure and berm were identified.

BC-9 - This building complex is inactive and no features of environmental significance are observed.

In the south-central section of Subarea C, adjacent to a building on West Pulaski Highway, there are possible stains and unidentified objects. Just to the east is the large fill area which consists of debris, possible solid waste, dark-toned material, light-toned material, medium-toned mounded material, ground scars, and unidentified objects. Further east, near State Route 279, three of the four impoundments containing standing liquid seen in 1990, an open storage area containing possible stains, crates, and unidentified objects are observed. Also noted in this general area are light-toned material and ground scars.

BC-11 - A retention basin containing standing liquid, a possible dry retention basin, and the electrical substation are observed at this building complex, which has not changed appreciably since 1990. Dark-toned material, disturbed ground, a ground scar, and an open storage area containing unidentified objects are also noted.

Southwest of Subarea C, between Nottingham Road and West Pulaski Highway is a large area consisting of numerous variously toned mounds of material and unidentified objects. Immediately west are possible debris and possible ground stains. East of the mounds are a possible ground stain and light-toned mounded material. On the south side of West Pulaski Highway are several light-industrial operations. Visible at these operations are six vertical storage tanks, two possible vertical storage tanks, overhead pipelines connecting the tanks, possible solid waste, debris and possible debris, possible stains, dark-toned material, numerous variously toned mounds of material, numerous probable crates, and unidentified objects. To the east is the fill area first identified in 1990 and which now contains possible solid waste.

At the industrial facility southeast of Subarea C and south of the railroad, numerous storage tanks and possible ground stains remain visible.

GLOSSARY

Access Road - A paved or unpaved route of vehicular access.

Berm/Dike - An embankment of either natural or man-made materials that impounds liquids, solids or other materials, or controls flood waters.

Building (B) - A relatively permanent, essentially boxlike construction having a roof.

Cleared Area (CA) - An area from which man has removed trees, shrubs, or other natural vegetative cover.

Container (CONT) - Any portable device in which material is stored, transported, handled, or disposed.

Dark- (DT), Medium- (MT), or Light-Toned (LT) - Tones of features in question are compared with the darkest and lightest tones of gray (if using B&W photography) on the print.

Debris (DB) - The remains of anything that can be identified as being broken down, destroyed, demolished, or dismantled.

Disturbed Ground (DG) - A rough area where the ground surface has been dug up or overturned.

Drums (DR) - Metal cylinders used for the storage, transportation, or disposal of materials.

Excavation Area (EX) - An area where earth or other material is being removed in order to alter the ground level (e.g., building construction).

Fill Area (FA) - An area where material is being deposited to fill a depression; or area where materials have been added, altering the elevation of the ground surface.

Ground Scar (GS) - An area of bare soil, apparently the result of human activity.

Impoundment (IM) - A liquid containment area that appears to be related to activity on a site but does not appear to be used for waste storage, disposal and/or treatment.

Material (M) - Raw or waste materials on or in the vicinity of the site.

Mounded Material (MM) - Piles of raw or waste materials on or in the vicinity of the site.

Open Storage Area (OS) - An area of open-air (outdoor) storage of containerized, raw or waste materials, within industrial or manufacturing sites.

Solid Waste (SW) - Any garbage, refuse, or sludge from a waste treatment, water supply treatment plant, or air pollution control facility, and other discarded material, including solid or semi-solid material resulting from industrial, commercial, mining, and agricultural operations, and from community activities; does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges.

Stain (ST) - A residue or discoloration resulting from a spill, discharge, or removed/dispersed materials.

Standing Liquid (SL) - A small, shallow, temporary collection of liquid, not necessarily waste. Not to include liquid contained in impoundments, trenches, pits, etc.

Tanks - Vertical tanks (VT), horizontal tanks (HT), pressure tanks (PT), tank farms, and solid waste management units. A large receptacle, container, or structure for holding liquid or gas.

Trench (TR) - A long, narrow excavation unrelated to drainage.

Waste Disposal Area (WDA) - An area where waste materials are discarded.

REFERENCES

MAPS

Source[a]	Figure	Name	Scale	Date
USGS	1	United States	1:2,500,000	1972
USGS	2	Bay View, MD-PA	1:24,000	1997
USGS	2	Elkton, MD-DE	1:24,000	1992
USGS	2	Newark West, DE-MD-PA	1:24,000	1992
USGS	2	North East, MD	1:24,000	1992

COLLATERAL INFORMATION

EPA. 2002. Collateral data and site map supplied by EPA Region 3 as attachment to Remote Sensing Services Request Form.

EPA. 1986. Site Analysis, Thiokol Corporation, Elkton, Maryland.

LMS (Lockheed Martin Services). 2002. Master Quality Assurance Project Plan. Prepared for EPA Environmental Sciences Division. Contract 68-D-00-267. Las Vegas, Nevada.

AERIAL PHOTOGRAPHS

Photo source[a]	Figure[b]	Date of acquisition	Original scale	Film type[c]	Mission I.D.	Source frame #	EPIC ID #
ASCS	3	05-02-38	1:20,000	B&W	ANI15	136-138	12323-12325
KVT	4-6	11-08-42	1:20,000	B&W	18A	129,130	81321,81322
KVT	7-9	03-12-47	1:24,000	B&W	VV-AS-M2-AMS	304-306	81323-81325
USGS	10-12	04-11-52	1:20,000	B&W	GS-UI	134-136	43074-43076
						137	5079
ASCS	13-15	08-13-57	1:20,000	B&W	ANI	43079:19-21	-
USDA	-	05-30-64	1:20,000	B&W	ANI	24,25	6014,6015
EPA	16-18	04-08-69	1:9,700	B&W	MD-BL	69-026:93-96	-
USGS	-	02-22-70	1:20,000	B&W	GS-VCLI	25,26	5081,5082
						27	12095
						60-62	12098-12100
USDA	-	08-20-72	1:40,000	B&W	24015	24,25	6061,6062
USDA	-	05-16-77	1:40,000	B&W	10003	107,108	12990,12991
						69-026:130-133	-
						69-026:146-149	-

(continued)

AERIAL PHOTOGRAPHS (continued)

Photo source[a]	Figure[b]	Date of acquisition	Original scale	Film type[b]	Mission I.D.	Source frame #	EPIC ID #
EPA	19-21	09-16-79	1:24,000	B&W	CE-4	147,148	43049,43050
USDA	-	07-07-80	1:40,000	B&W	24015	27,28	168,169
EPA	-	12-18-85	UNK	CC	UNK	85-085:46-49	-
USGS	-	09-04-87	1:40,000	CIR	NAPP	121,122	43072,43073
USGS	-	04-17-88	1:40,000	CIR	NAPP	144,145	65763,65764
KEY	22-24	03-01-90	1:19,000	B&W	M3319	103,104	43096,43097
						105	81649
USGS	-	04-06-92	1:40,000	B&W	NAPP	44,45	81726,81727
						76	41846
						122,123	81728,81729
USGS	-	03-20-99	1:40,000	B&W	NAPP	31,32	81730,81731
USGS	25-27	04-13-99	1:40,000	B&W	NAPP	244,245	62219,62220
						85	81732

[a]ASCS U.S. Department of Agriculture, Agricultural Stabilization and Conservation Service, Salt Lake City, Utah
EPA U.S. Environmental Protection Agency, Environmental Sciences Division, Las Vegas, Nevada
KEY Keystone Aerial Surveys, Inc., Philadelphia, Pennsylvania
KVT King Visual Technology, Hyattsville, Maryland
USDA U.S. Department of Agriculture, Salt Lake City, Utah
USGS U.S. Department of Interior, U.S. Geological Survey, Washington, D.C.

[b]Photographs listed with no figure number were analyzed but not placed in this report because no significant features or changes had occurred since the previous photographs

[c]B&W Black-and-white
CIR Color infrared
CC Conventional color